Abstract

A laser-based device for non-mechanical, three-dimensional trepanation during cornea transplants comprises

- a computer-assisted control and regulation unit (4) provided with at least one control computer (5, 6, 7) and at least one display unit (8, 9), as well as
- a laser source (2) for generating a working laser beam (3)

as well as

- a multi-sensor processing head (1) integrated into which are:
  - an axial beam positioning system (11) into which the working laser beam (3) can be coupled,
  - a focal point tracking unit (12) for the z-position displacement of the focal point (13) of the working laser beam (3)
  - an x-y-scanner unit (14, 15) for the x and y-position displacement of the working laser beam (3),
  - an eye position sensor unit (23, 24, 35, 36) for detection of the position of the eye, and
  - a plasma sensor unit (16, 25) for detection of the plasma glow that occurs during the cornea trepanation.